

WINDS.

The most frequent directions of the wind during August, 1885, are shown on chart ii by arrows flying with the wind. Along the Atlantic coast the prevailing directions were mostly south or southwest; in the lower lake region, Ohio Valley and Gulf States, variable; in the upper lake region, upper Mississippi and Missouri valleys, mostly north or northwest; in the Rocky Mountain and Pacific coast regions, variable.

HIGH WINDS.

(In miles per hour.)

On the summit of Mount Washington, New Hampshire, winds of fifty or more miles per hour occurred during the month, as follows: 80, s., 3d; 92, s., 4th; 50, nw., 5th; 54, sw., 13th; 75, nw., 14th; 68, n., 15th; 60, nw., 19th; 62, nw., 20th; 55, sw., 21st; 78, nw., 22d; 58, nw., 23d; 56, nw., 25th; 58, nw., 26th.

Other stations registering wind-velocities of fifty miles or more per hour are as follows:

Sandy Hook, New Jersey, 50, se., 3d.
Pike's Peak, Colorado, 54, nw., 6th.
Sandusky, Ohio, 63, nw., 9th.
Smithville, North Carolina, 98, s. and sw., 25th.
Savannah, Georgia, 56, nw., 25th.
Wilmington, North Carolina, 52, sw., 25th.
Kitty Hawk, North Carolina, 50, n., 25th.
Charleston, South Carolina, hurricane, se., 25th.
Fort Macón, North Carolina, 92, sw., 25th; 68, sw., 26th.
Fort Maginnis, Montana, 63, ne., 26th.
Hatteras, North Carolina, 52, s., 26th.

LOCAL STORMS AND TORNADOES.

Davenport, Iowa: during the afternoon of the 1st a heavy rain and thunder-storm passed over this place in a direction from northeast to southwest. Several houses were struck by lightning, and the roof of the Chicago, Rock Island and Peoria freight office was blown off.

Milan, Gibson county, Tennessee: a tornado occurred five miles east of this place on the 1st; it pursued an easterly course, blowing down buildings and destroying crops in its path, which was about two hundred yards wide and one-half mile long. Hail-stones of considerable size accompanied the storm.

Bethlehem, Northampton county, Pennsylvania: a violent thunder-storm, accompanied by hail and very heavy rain, passed north of this place between 4 and 5 p. m. on the 1st. The heavy rainfall caused much damage to railroads and other property.

Frederick, Frederick county, Maryland: a severe storm prevailed on the 2d; it began about 6 p. m. and continued until past midnight. The very heavy rainfall caused the overflow of Carroll Creek, resulting in the flooding of a large part of the town. The damage is estimated at \$15,000. Reports from various parts of the county state that much damage was done by the heavy rains, and that in many cases the county roads were rendered impassable.

Elkton, Cecil county, Maryland: during the night of the 2-3d a tornado occurred about four miles southwest of Elkton, its path being about one hundred yards wide. Many trees were blown down and several buildings damaged. The tornado is reported to have been of only a few minutes' duration and was accompanied by a loud, roaring sound. The heaviest rain storm of the season occurred on the 3d.

Westminster, Carroll county, Maryland: the heaviest rain storm experienced in this vicinity for many years occurred during the night of the 2-3d. Rain began at about 7 p. m. and continued until 10 a. m. Great damage was done to crops, bridges, and other property.

Cambridge, Dorchester county, Maryland: at about 7 p. m. on the 3d a tornado passed through the lower part of this county. The country through which the tornado passed is mostly marsh land and but thinly populated, otherwise the damage, which was slight, would have been much greater. A few buildings were destroyed.

Wilmington, Delaware: reports from Smyrna, Kent county, state that a tornado occurred on the afternoon of the 3d. Its path was about three hundred feet wide, and several miles in length. Much damage was done to orchards and crops.

Readington, Hunterdon county, New Jersey: the heavy rain and wind storm on the 3d caused damage in this county, estimated at \$40,000.

Buffalo, New York: a gale prevailed from 7.25 p. m. on the 3d to 5.10 p. m. on the 4th; a maximum velocity of forty-three miles from the southwest occurred at 8.25 a. m. on the latter date.

New York City: a southerly gale prevailed from 2.15 to 9.45 p. m. on the 3d, causing much damage on the Long Island and New Jersey coasts. The heavy rainfall resulted in flooding many cellars in Brooklyn and Jersey City.

Sandy Hook, New Jersey, 3d: a strong southeasterly gale prevailed from 2 a. m. to 11 p. m., the wind reaching a maximum velocity of fifty miles per hour.

Erie, Pennsylvania: the high winds on the 3d caused much damage to crops in this vicinity.

Reading, Pennsylvania: the storm of the 3d was very severe, and caused considerable damage in Berks county.

The Signal Service observer at Philadelphia, Pennsylvania, reports, concerning the tornado which occurred on the 23d, as follows:

The day opened with fresh easterly winds and a threatening appearance of the sky, the barometer, at the morning observation, reading about one-tenth of an inch lower than on the previous morning. Rain began at 11.35 a. m., and continued throughout the day, and at intervals fell heavily. At 2.20 p. m. thunder was heard in the northwest, being loudest about 2.35 p. m. At 3 p. m. a very heavy shower fell, lasting twenty minutes. At 3.15 the wind, which had been blowing steadily from the southeast all day, shifted to west-northwest, and blew with considerable force for about three minutes, afterward shifting back to the southeast. About this time the tornado passed up the Delaware River from the vicinity of Red Bank, New Jersey, striking Philadelphia, near Greenwich Point, where it demolished a portion of the works of the Pennsylvania Salt Company; thence the tornado crossed the river, wrecking the steamers "Major Keybold" and "Peerless." After striking the New Jersey shore the tornado passed along the river front from Dialogue's shipyard to Bridge avenue, Camden, and northward through the latter city, causing great destruction to property. More than five hundred dwelling houses were unroofed or blown down in that part of Philadelphia known as Port Richmond, and in Camden. The damage is estimated at more than \$500,000. Six persons were killed and more than one hundred injured. The tornado is described by those who witnessed its passage across the river, as an immense, black, funnel-shaped cloud nearly resting upon the water and extending to the rain clouds above it. It was accompanied by a terrific noise, similar to the sound of escaping steam. The course of the storm was in a straight line N. 22° E. from Greenwich Point to Port Richmond, a distance of eight miles, which was traversed in about sixteen minutes. The path of destruction varied from one to two squares in width, that part of it on the south side of the tornado's track being much greater than that on the opposite side. No rain fell in the immediate path of the tornado during its progress, but in about half an hour afterward heavy rain fell, which caused a large amount of damage, principally to effects belonging to the partly destroyed buildings.

Oberlin, Decatur county, Kansas: a violent storm occurred at this place during the afternoon of the 3d; the wind attained an estimated velocity of seventy-five miles per hour from the east. The storm moved in a southeasterly direction.

Fort Verde, Arizona: a heavy rain storm, accompanied by high wind and hail, occurred during the afternoon of the 5th. A number of trees and telegraph poles in this vicinity were prostrated.

San Carlos, Arizona: reports from Globe City, in this territory, state that the severest wind, rain, and hail-storm ever known at that place occurred on the 5th. Buildings were unroofed, and other damage caused.

Omaha, Nebraska: reports state that a tornado passed down Loup Creek valley during the night of the 5-6th, causing much damage at Ord, Valley county. The storm was of about twenty minutes' duration.

Nephi, Juab county, Utah: the thunder-storm of the 6th was the severest ever known at this place. Numerous washouts occurred along the Utah Central railroad in Utah county.

Fargo, Dakota: a remarkably heavy fall of rain occurred

here during the afternoon of the 7th, causing great damage to crops.

Bird's Nest, Northampton county, Virginia: the rainfall accompanying the storm of the 8th was remarkably heavy, more than six inches having fallen.

Racine, Wisconsin: a violent electrical storm prevailed at this place during the night of the 8-9th; much damage was done by lightning. The storm was accompanied by very heavy rainfall, which caused a large amount of damage to crops.

Tiffin, Seneca county, Ohio: a severe storm prevailed in this vicinity on the 9th. Some buildings were unroofed and much timber was destroyed.

Sandusky, Ohio: a very severe storm prevailed here during the afternoon of the 9th. It began about 3 p. m., with very sharp lightning, thunder, and heavy rainfall. From 3.03 to 3.32 p. m. the wind blew at the rate of sixty-three miles per hour. A large amount of damage was done throughout the city.

Kansas City, Missouri: a heavy rain storm occurred during the early morning of the 11th, flooding cellars and streets in all parts of the city. Two brick buildings were undermined and other damage caused.

Albany, New York: a heavy rain storm occurred on the 12th at Hoffman's Ferry, a station on the New York Central and Hudson River railroad, about forty miles west of Albany, causing great damage to the crops in that vicinity, and washing away about three hundred feet of the railroad track. The losses sustained will aggregate several thousand dollars.

Schenectady, Schenectady county, New York: a violent storm occurred at Glenville, about six miles distant, during the afternoon of the 12th. It was accompanied by a remarkably heavy rainfall, which caused much damage to railroads and other property.

Norwood, Saint Lawrence county, New York: a tornado occurred at this place about 5 p. m. on the 12th. Many buildings and trees were blown down, and the Ogdensburg and Lake Champlain railroad bridge, nearly three hundred feet long, was carried a distance of from thirty to forty feet and dropped into the river. Two persons were killed and many injured. The losses are variously estimated at from \$50,000 to \$200,000.

Reading, Pennsylvania: during the night of the 13-14th a very heavy fall of rain occurred over Greenwich township, in this county. The storm was of about one hour's duration, and was confined to a small area. The Schuylkill River rose four feet.

New York City: on Long Island barns were blown down and dwellings unroofed by the storm during the night of the 13-14th.

Rochester, New York: a severe storm of wind, rain and hail passed over the mouth of the Irondequoit Bay at about 6 a. m. of the 14th. It was of very short duration, the most violent part lasting about five minutes.

Independence, Jackson county, Missouri: more than seven and one-half inches of rain fell at this place on the 14th.

San Diego, California: reports from Mesa Grande, about sixty miles to the eastward of San Diego, state that on the 14th an unusually violent storm visited that vicinity and caused a large amount of damage to orchards and crops. The storm was accompanied by very heavy rain, and hail of considerable size. A large number of orchard trees were uprooted and many tons of ripe fruit destroyed.

Cœur d'Alene, Idaho: a severe southwesterly storm prevailed at this place between 11 and 11.55 p. m. on the 18th. Trees one and one-half feet in diameter were blown down or broken off by the high wind. The path of the storm is reported to have been about one mile in width.

Erie, Pennsylvania: a very severe thunder-storm prevailed from 11.30 p. m. of the 18th to 1 a. m. of the 19th, the electrical discharges being very unusual; a number of times during the storm all of the electric lights in the city were extinguished. Dwellings, barns, fences, etc., were blown down by the high winds. Heavy losses are reported from the surrounding country.

Charleston, South Carolina, 24th: reports state that on the 20th a violent storm passed over Darlington, unroofing buildings and causing other damage.

Chicago, Illinois: during a thunder-storm on the night of the 20-21st, a large mercantile establishment in this city was struck by lightning and set on fire, resulting in a loss estimated at between \$40,000 and \$50,000.

Rochester, New York, 21st: from 9 to 10.30 p. m., one of the most remarkable electrical storms known for many years prevailed, the flashes of lightning being very vivid and almost continuous. At 10 p. m. the wind reached a velocity of twenty-eight miles per hour.

Scranton, Lackawanna county, Pennsylvania: during the afternoon of the 21st this place was visited by a severe storm, which blew down trees, out-buildings, etc., in the western part of the town.

Buffalo, New York: the most severe and destructive electrical storm of the season passed over the city in a direction from southwest to northeast at 7 p. m. of the 21st. The lightning was almost continuous, and caused considerable damage to telegraph lines. From 9.30 a. m. to 11.30 p. m. high winds prevailed, a maximum velocity of forty-two miles from the west occurring at 8.15 p. m.

Auburn, New York: the storm which occurred during the night of the 21-22d was one of the severest that has occurred for many years.

Menand Station, (near Albany), New York: on the 22d, 2.20 inches of rain fell in nine hours. Much damage was done to crops; and the roadways were badly washed.

Cincinnati, Ohio: a destructive storm occurred during the afternoon of the 22d. The wind reached a velocity of thirty-one miles per hour, and for five minutes it blew at the rate of thirty-nine miles. The rainfall for fourteen minutes amounted to 0.77 inch. This storm caused damage estimated at from \$27,000 to \$28,000.

Frisco, Utah: a "cloud-burst" occurred on a ridge of mountains about three miles and a half northwest of this station, at about 9 p. m. on the 22d. The water is reported to have rushed down the sides of the mountain with such force that large boulders were displaced and small trees torn up.

Hartford, Connecticut: a destructive storm occurred to the north and west of this place on the 24th.

New London, Connecticut: an unusual electrical storm occurred during the afternoon of the 24th. At 7.10 p. m. there was a flash of lightning which traversed the whole sky from west to east, making an illumination as bright as mid-day. The flash was followed by a report which caused houses to shake as if by an earthquake. This electrical discharge caused much damage to the telegraph and telephone wires in this vicinity; it also destroyed about twenty feet of a large water-main, allowing a column of water two feet in diameter to escape with such force as to ascend sixty feet into the air.

Saint Paul, Minnesota 28th: a special dispatch from Corn- ing, Adams county, Iowa, states that the heaviest rainfall ever known in that vicinity occurred during the night of the 23-24th. More than three miles of track and much of the road-bed of the Chicago, Burlington, and Quincy railroad were washed out. The east and west branches of the Nodaway River rose to a height of six feet above any previous flood mark. The damage in that county, independent of that sustained by the railroads, is estimated at \$100,000.

Hopkinsville, Christian county, Kentucky: reports received on the 25th state that at about midnight of the 24-25th a tornado passed through the northern part of this county, causing a large amount of damage. Buildings, orchards, and forest trees for a distance of one-half mile were levelled, some trees three feet in diameter being broken off close to the ground. Several buildings were totally destroyed near Earlington, Hopkins county.

Salt Lake City, Utah: at 2.30 p. m. of the 25th a "cloud-burst" occurred at Hot Springs, on the northern border of this city, and somewhat later another occurred in City Creek Cañ-

on, about three miles northeast of station. A thunder-storm, accompanied by small hail, prevailed at Salt Lake City during the afternoon. Considerable damage was done to crops in the surrounding country.

Fort Maginnis, Montana: a severe storm prevailed from 4.50 to 6 p. m. on the 26th, the wind reaching a maximum velocity of sixty-three miles per hour. Very heavy rain and some hail accompanied the storm.

Tallahassee, Florida: trees and fences were blown down and the cotton crop seriously injured by the rain and wind storm of the 30th.

The following are reports of tornadoes which occurred during August, 1885, forwarded by special tornado observers of the Signal Service, of whom there are more than 1,400.

3d.—A tornado occurred at Camden, New Jersey, and Philadelphia, Pennsylvania, at 3.20 p. m. It pursued a north-northeasterly course for a distance of eight miles, its path being of an average width of 1,200 feet. The shortest time in passing a given point was thirty seconds, and its progressive movement is estimated at fifty miles per hour. Five hundred buildings were either destroyed or injured, and two steamers were wrecked; six persons were killed and nearly one hundred injured. The damage is estimated at \$500,000. (See report of Signal Service observer at Philadelphia concerning this storm.)

3d.—At 4 p. m. a tornado started at a point one mile above Feasterville, Bucks county, Pennsylvania, and passed through Churchville and Richborough, ending at Pineville, a distance of eleven miles from where it first started. Its course was to the northward, and in its path five dwellings, seven barns, and many other out-buildings were destroyed. The shortest time in passing a given point was two minutes.

3d.—At 2.30 p. m. a tornado occurred at Thompsettown, Juniata county, Pennsylvania. It moved in a northeasterly direction for a distance of two miles, the width of its path being about 1,200 feet. But little damage was done.

3d.—A tornado occurred at Solebury, Bucks county, Pennsylvania, at 4.30 p. m. Its course was N. 35° E. Several buildings were destroyed or damaged, entailing a loss of \$3,000.

3d.—A tornado occurred north of Lansdale, Montgomery county, Pennsylvania, at about 4 p. m. A number of buildings were destroyed or unroofed.

3d.—At 11.30 a. m. a tornado started at Lederachsville, Montgomery county, Pennsylvania, and passed through Lower Salford, ending near Summeytown. Its course was N. 10° W.; several barns were destroyed.

3d.—A tornado occurred in Pacopsin township, West Chester county, Pennsylvania, at 5.30 p. m. The tornado-cloud was funnel-shaped and moved in a north-northeasterly direction for a distance of one and one-half miles. Several out-buildings were destroyed.

3d.—A tornado occurred near Milford, Bucks county, Pennsylvania; its path was about twenty feet in width, and the progressive movement about twenty miles per hour. Some out-buildings were destroyed.

3d.—A tornado occurred during the afternoon, at "The Hickory" near Bel Air, Harford county, Maryland. There were two tornado-clouds, both of which were funnel-shaped.

3d.—A tornado occurred in Cecil county, Maryland, at about noon. It passed through Elk Neck and New Leeds, and ended two miles above Cherry Hill. Its course was in a direction N. 12° E., for a distance of fourteen miles, the path being from three hundred to six hundred feet in width. A number of buildings were destroyed.

3d.—A tornado occurred on the Patapsco River, in Maryland, at 5.20 p. m. The tornado-cloud was funnel-shaped and moved in a northeasterly direction.

3d.—A tornado occurred at Buckstown, Dorchester county, Maryland, at 7 p. m. The tornado-cloud was funnel-shaped and moved in a northeasterly direction, its path being about sixty feet in width. A dwelling and barn were destroyed; damage \$1,000.

3d.—At 4.45 p. m. a tornado passed from a point one-half mile southwest of McDonough, New Castle county, Delaware, to a point one mile south of Delaware City. The funnel-shaped tornado-cloud moved in a direction northeast by north for a distance of nine miles at an average velocity of twenty miles per hour. Two dwellings and a number of out-buildings were destroyed. The damage is estimated at \$5,000.

3d.—A tornado occurred at Metomen, Fond du Lac county, Wisconsin, at 2.35 p. m. Its path was in a southeasterly direction for a distance of ten miles, and was about two hundred and fifty feet wide. Some out-buildings were destroyed.

5th.—A tornado occurred near Arrington, Atchison county, Kansas, at 1.25 p. m. Its course was in a direction east by north for a distance of one mile.

12th.—At 4.48 p. m. a tornado occurred at Norwood, Saint Lawrence county, New York, and moved in a direction E. 20° N. for a distance of fifteen miles, its path being one-half mile in width. The shortest time in passing a given point was from three to five minutes. Two persons were killed, ten injured, and property valued at \$150,000, destroyed.

NAVIGATION.

STAGE OF WATER IN RIVERS.

In the following table are shown the danger-points at the various river stations; the highest and lowest stages for August, 1885, with the dates of occurrence, and the monthly ranges:

Heights of rivers above low-water mark, August, 1885.

[Expressed in feet and tenths]

Stations.	Danger-point on gauge.	Highest water.		Lowest water.		Monthly range.
		Date.	Height.	Date.	Height.	
<i>Red River:</i>						
Shreveport, Louisiana.....	29 9	1	15 3	31	3 9	11 4
<i>Arkansas River:</i>						
Fort Smith, Arkansas.....	22 0	16	8 2	28	4 3	3 9
Little Rock, Arkansas.....	23 0	20	8 2	31	5 1	3 1
<i>Missouri River:</i>						
Yankton, Dakota.....	24 0	2	17 9	27, 28	15 5	2 4
Omaha, Nebraska.....	18 0	2	10 7	31	7 4	3 3
Leavenworth, Kansas.....	20 0	1	13 4	23, 24	9 5	3 9
<i>Mississippi River:</i>						
Saint Paul, Minnesota.....	14 5	1, 2	4 3	23 to 30	3 0	1 3
La Crosse, Wisconsin.....	24 0	1	8 6	31	4 5	4 1
Dubuque, Iowa.....	16 0	4, 5	9 6	31	5 7	3 9
Davenport, Iowa.....	15 0	4, 26	8 2	17 to 22	5 0	3 2
Keokuk, Iowa.....	14 0	29	12 0	21	5 5	3 5
Saint Louis, Missouri.....	32 0	15	19 6	26	12 9	6 7
Calvo, Illinois.....	40 0	17	20 5	29	14 3	6 2
Memphis, Tennessee.....	34 0	19, 20	13 3	31	9 2	4 6
Vicksburg, Mississippi.....	41 0	1	13 5	31	13 2	5 3
New Orleans, Louisiana*.....	—3 0	1	—6 5	16, 17	—11 7	2 9
<i>Ohio River:</i>						
Pittsburg, Pennsylvania.....	22 0	26	12 3	2	1 4	10 9
Cincinnati, Ohio.....	50 0	31	19 7	1	7 5	12 2
Louisville, Kentucky.....	25 0	9	7 0	2	4 3	3 3
<i>Chamberland River:</i>						
Nashville, Tennessee.....	40 0	20	6 0	31	1 1	4 9
<i>Tennessee River:</i>						
Chattanooga, Tennessee.....	33 0	16	4 4	30, 31	1 3	3 1
<i>Monongahela River:</i>						
Pittsburg, Pennsylvania.....	29 0	25	12 3	2	1 4	10 9
<i>Savannah River:</i>						
Augusta, Georgia.....	32 0	31	10 0	27, 29	5 0	5 0
<i>Mobile River:</i>						
Mobile, Alabama.....	9, 11, 30	16 8	20	15 0	1 8	
<i>Sacramento River:</i>						
Red Bluff, California.....	1 to 20	0 5	21 to 31	0 4	0 1	
Sacramento, California.....	1 to 11	7 8	26 to 31	7 3	0 5	
<i>Willamette River:</i>						
Portland, Oregon.....	1	6 0	20	3 6	2 4	
<i>Colorado River:</i>						
Yuma, Arizona.....						

* Below high-water mark of 1874 and 1883.

The observer at Chattanooga reports that navigation in the lower Tennessee River was suspended on the 25th, on account of low water.

HIGH TIDES.

New London, Connecticut, 3d: very high tide, flooding cellars and low grounds.

Cedar Keys, Florida, 9th to 12th.

Eastport, Maine, 14th, 15th, 16th.

New York City, 9th.

Portsmouth, North Carolina, 9th.